

Substance Use Disorder Relapse and Readmissions

Vincent Ekstrom

Arizona State University

Abstract

According to the National Institute on Drug Abuse (NIDA), tobacco, alcohol, and illicit drugs accounted for 820 billion dollars in costs related to crime, lost work productivity, and health care services. Nearly 20 million Americans suffer from substance misuse, but only 3.7 million received treatment. Of those who receive treatment, the risk of relapse is high, ranging from 40-60% within a year of treatment. Improvement in the treatment of substance use disorders (SUD) is necessary to improve the health of our society. Current literature demonstrates that individualized recovery plans and follow-up care are effective in reducing relapse and readmission. Costs to the individual, institution, and healthcare system can be reduced. This project aimed to decrease the risk for relapse and readmission with recovery plan reviews at 72hrs, and two-weeks, post-discharge. The risk of relapse was measured by the Time-To-Relapse questionnaire and the UCLA loneliness scale. The project took place in a residential treatment facility in Phoenix, Arizona. There were five participants initially; two were lost at the two-week follow-up. Pre and post-test results were compared to measure potential predictability of relapse. The two-tailed paired samples *t*-test was performed to compare the means of the scores but yielded insignificant results. All participants maintained sobriety. Qualitative data via interview showed positive results demonstrated by statements from the participants. Recovery plan review with follow-up care is a promising evidence-based practice that can be implemented to help individuals maintain sobriety. Additional research is recommended to examine further the impact on the maintenance of sobriety over time.

Keywords: substance use disorder, recovery plan, follow-up, relapse, readmission

Substance Use Disorder Relapse and Readmissions

According to the National Institute on Drug Abuse (NIDA), tobacco, alcohol, and illicit drugs accounted for 820 billion dollars in costs related to crime, lost work productivity, and health care services (National Institute on Drug Abuse [NIDA], n.d.). In 2018, the National Survey on Drug Use and Health reported that “approximately 20.3 million people aged 12 or older had a substance use disorder (SUD) related to their use of alcohol or illicit drugs in the past year” (Substance Abuse and Mental Health Services Administration [SAMSHA], 2019, p.1). Despite the significant need, only 3.7 million received any substance use treatment within the past year (SAMHSA, 2019). The gap in treatment is lethal, as 70, 237 people died in 2017 due to drug overdose, and an additional 88,000 deaths were related to alcohol (NIH; CDC). Due to the severity of the impact on the United States, treatment for substance use disorders must be more effective.

Problem Statement

Any drug taken in excess has a direct stimulation on the brain reward system (American Psychiatric Association [APA], 2013). Drugs of abuse produce feelings of pleasure and reinforce behaviors and memories of use. A significant reason SUD’s are challenging to treat is because of the pleasure derived from stimulation of the reward system. The Diagnostic and Statistical Manual of Mental Health Disorders (DSM) separates drugs into ten classifications: alcohol; caffeine; cannabis; hallucinogens; inhalants; opioids; sedatives, hypnotics, and anxiolytics; stimulants; tobacco; and unknown substances. The defining characteristic of a substance use disorder is a “cluster of cognitive, behavioral, and physiological symptoms indicating that the individual continues using the substance despite significant substance-related problems” (APA, 2013, p. 483). Remission/recovery occurs when an individual no longer meets the criteria for a

substance use disorder, indicating improvement (APA, 2013). Relapse can be defined as the recurrence of symptoms of a disease after a period of recovery (*Relapse*, n.d.).

Mental Health America (MHA), Substance Abuse and Mental Health Services Administration (SAMHSA), and the World Health Organization (WHO) have initiatives to reduce the negative impact of substance abuse, yet relapse rates for SUD's are estimated between 40-60% within a year of obtaining sobriety (NIDA, n.d.). Thirty-day hospital readmission rates for substance use disorders are between 18-27% (Hines, Barrett, Jiang, & Steiner, 2014). The average length of stay for inpatient treatment of SUD is 4.5 days, with an average cost of \$6,700 (Heslin, Elixhauser, & Steiner, 2006). Mental health or substance use disorders were among the conditions resulting in the most, all-cause, 30-day readmissions for Medicaid patients, resulting in a total of 113,100 readmissions for a cost of \$832 million (Hines et al., 2014). Individuals with substance use disorders have a higher prevalence of 19 major medical conditions and higher disease burden than those without a substance use disorder (Bahorik et al., 2017). Patients undergoing acute treatment for detox may experience personal and medical crises that can exacerbate emotional, psychological, or mental conditions that can hinder the decision making and critical thinking abilities required throughout recovery to maintain sobriety (Miller & Kipnis, 2006).

Healthy People 2020 initiatives for substance abuse include increasing the proportion of people who need and receive specialty treatment for abuse or dependence and reducing the number of deaths attributable to alcohol or drugs (Healthy People, 2020). Treatment Improvement Protocols (TIPs) were developed by the Center for Substance Abuse Treatment (CSAT) to prevent substance use readmissions, and are best practice guidelines for the treatment of substance use disorders. CSAT is a subdivision of SAMHSA that provides national leadership in substance use

treatment. Its mission is to promote community-based substance abuse treatment and recovery services in every community. Additionally, the United Nations Office on Drugs and Crime (UNODC) created the International Standards for the Treatment of Drug Use Disorders to disperse good practice examples that are evidence-based to improve care in areas where treatment is ineffective and not supported by evidence. Within these documents, strategies for readmission and relapse prevention, along with many other aspects of treatment are provided.

Individuals who have more social support report lower psychological distress (Segrin, McNelis, & Swiatkowski, 2016). Social support has an indirect effect on problem-drinking by reducing psychological distress. Loneliness is a form of psychological distress and has negative impacts on self-esteem and affect (Xia & Yang, 2019). Social isolation is associated with an increased risk of substance use. Individuals with lower social support experienced higher levels of drinking-related problems (Segrin, McNelis, & Swiatkowski, 2016). Socially isolated youth are more at-risk for engaging in alcohol or cigarette use (Nino, Cai, & Ignatow, 2016). Group therapy, support groups, and networks like Alcoholics Anonymous are beneficial because members see they are not alone in their struggle (Yalom & Leszcz, 2005). They find support, connection, and friendship in the groups and are antidotes to isolation, alienation, and loneliness. Through involvement in groups, individuals have the opportunity to observe others who have gone through the same problems and have improved their lives. Clients gain hope that they can get better by watching others that have changed their lives. The universality of human problems can provide a client with a significant source of relief (Yalom & Leszcz, 2005).

Purpose & Rationale

The purpose of this project is to improve the quality of recovery planning and follow-up care for the patient diagnosed with any substance use disorder, subsequently reducing their risk for relapse and readmission to a treatment facility.

Background & Significance

Outpatient services are associated with better outcomes in substance use treatment (Timko, Schultz, Britt, & Cucciare, 2016). Upon discharge from an inpatient setting, patients have outpatient substance use services coordinated to continue treatment; however, patient utilization of outpatient services upon inpatient discharge trends as low as 40-50% (Garnick, 2017; Marino, 2016; Timko, Schultz, Britt, & Cucciare, 2016). Medicaid analysis found that 67.7% of individuals treated for inpatient substance use had no residential or outpatient services within 14 days of hospital discharge (Reif, Avebedo, Garnick, & Fullerton, 2017). Patients have identified the distance to travel for services, other life responsibilities, and financial costs of treatment as barriers to follow up (Marino et al., 2016). Therefore, it is not surprising that inpatient readmissions were about 29.3% within 90 days of discharge, with many occurring in the first week (Reif et al., 2017).

Treatment Improvement Protocols (TIPs) were developed by the Center for Substance Abuse Treatment (CSAT) to prevent substance use readmissions, and are best practice guidelines for the treatment of substance use disorders. Additionally, the United Nations Office on Drugs and Crime (UNODC) created the International Standards for the Treatment of Drug Use Disorders to disperse good practice examples that are evidence-based in hopes of improving care in areas where treatment is ineffective and not supported by evidence. Within these documents, strategies for readmission and relapse prevention, along with other aspects of treatment are provided. Immediately after admission, the development of goals and plans for substance use treatment post-discharge should be discussed

daily (Busse, Gerra, Koutsenok, & Saenz, 2015). Additionally, effective treatment planning includes strategies for a successful transition to the next treatment, and support should be given to help navigate the social and health care systems (Busse et al., 2015).

A psychiatric inpatient unit within the Veterans Affairs (VA) medical system, evaluated the implementation of a recovery-oriented model of care (Zuehlke, Kotecki, Kern, Sholty, & Hauser, 2016). In this initial model, treatment and discharge planning on the unit were provider-driven (Zuehlke et al., 2016). On another psychiatric inpatient unit with the VA system, the process was modified to include direct patient participation in treatment planning (Koval et al., 2016). Both units incorporated a peer support specialist to assist with individual recovery goal development and access to resources (Zuehlke et al., 2016). While readmission rates among one facility did not change significantly with the intervention, patients had higher satisfaction with the care provided (Zuehlke et al., 2016). The second facility demonstrated a decrease in readmission percentages after implementation (Koval et al., 2016). The intervention included direct involvement of the patient in their recovery, revision of policies and procedures to reflect the importance of recovery, and extensive staff training on recovery principles (Koval et al., 2016). This intervention demonstrates that including the patient directly in treatment planning is very useful for recovery.

Bridging strategies implemented before discharge can be useful for increasing the odds of successful contact with outpatient resources (Taylor et al., 2016). One adult inpatient unit initiated a brief interview addressing goals and barriers immediately before discharge to increase engagement in aftercare and reduce early psychiatric readmissions. Patients who did not receive the intervention were twice as likely to be readmitted within thirty days (Taylor et al., 2016).

Brief Critical Time Intervention (BCTI) is an Evidenced Based Practice (EBP) demonstrated to be highly effective in connecting patients to outpatient treatment (Shaffer et al.,

2015). Acute service coordinators (ASC) at a community health organization identify unmet patient needs and develop a personalized discharge plan. The ASC's were directed to provide more intense recovery planning. They focused on strengths and connections to community resources to help patients develop autonomy. Individuals that received the BCTI had a readmission rate of 28% compared to 47% in those who did not receive the intervention (Shaffer et al., 2015).

Another strategy for improving readmissions is a recovery interview. This intervention was developed by a medical center in Pennsylvania for use in inpatient substance use programs. The meeting is approximately 15-30 minutes and focuses on eight different topic areas relating to reasons for readmission, use of crisis plan, discharge planning, and barriers. The group receiving the intervention had lower readmissions and reduced odds of readmission (Hutchison et al., 2018).

Maarevand et al. (2015) explored a community based relapse prevention plan with a motivational interview at discharge. The study was a randomized controlled trial with 71 participants. Drug tests were done at 45 and 90 days as a quantitative measure of abstinence. The motivational interview at discharge and the involvement of community members had a higher rate of abstinence than the control group. All of the individuals who relapsed in during the program did so within the first 45 days post-intervention.

Another randomized controlled trial was conducted in Zambia and used treatment recommendations from the WHO mental health general action plan (mhGAP) (Sheikh et al., 2017). A single 20-minute motivational interview was conducted with the patient and the family member at discharge. There were significant reductions in the frequency of alcohol use for those that did not remain abstinent. In addition, the intervention group had an average abstinence period of 51 days versus 10 days in the control group.

Ongoing studies are evaluating interventions for this population with the desired outcome of reducing readmission rates. One intervention is a patient navigator who provides a motivational interview at the time of discharge and assists patients in their transition to outpatient treatment. The intervention includes helping with a lack of transportation, lack of an ID card, and other external barriers. They also assist in resolving internal barriers to treatment like decreased motivation for treatment (NCARE, n.d.; NAVSTAR, n.d.). No outcome data is available for these interventions as they are still in progress, but patient navigators are of significant interest.

The quality of network ties and efficiency amidst substance use programs are associated with readmissions (Spear, 2014). Higher efficiency programs get the patient connected to services more quickly. Programs with higher efficiency were associated with lower odds of readmission for compared to low-efficiency programs with higher readmission risk (Spear, 2014).

Internal Evidence

The project took place in a residential treatment facility in Phoenix, Arizona. The facility has not conducted formal quality improvement projects or research regarding substance use readmission rates. However, when meeting with clinical leaders, administration, and site champions, they described readmission rates for substance abuse disorders as a problem that has been observed by many staff members, which include nurses, social workers, and clinicians. Repeat admissions provide an opportunity to improve on the quality of care that is provided. The site champions have a desire to improve the outcomes for individuals diagnosed with substance use disorders. Additionally, reimbursement has changed in recent years, and readmission for substance use may become a marker in which insurance uses to calculate payments. Key stakeholders are concerned and want to protect the facility's role in providing mental health services while also maintaining financial stability.

PICO Question

Substance use disorder readmissions are detrimental for this facility and the entire health care system. Based on the internal data of the organization and the desired outcome the following clinical question was developed: In adult hospitalized patients diagnosed with substance use disorder (P), how does a Relapse Prevention Plan review (I) compared to standard discharge instructions (C) affect self-efficacy and readmission rates (O)?

Evidence Synthesis**Search Strategy**

Respective to the PICO question, an exhaustive search was performed. Three databases were used: CINAHL, PsycINFO, and PubMed. Three grey literature resources were also exhausted using: Health Sciences Online, Virginia Henderson Global Nursing e-repository, and MedNar. Keywords included: *Substance use disorder, addiction, substance abuse, rehospitalization, readmission, relapse, recovery, discharge, intervention*. Limits were set to the English language, an origination date of 1-1-2014 or sooner, and published in a peer-reviewed journal and/or database. Initial results yielded 51 results in CINAHL, 99 results in PsycINFO, and 525 results in PubMed. After the evaluation of search results, terms were reduced to “substance use disorder” and readmission or rehospitalization to yield more relevant results. Producing 15 results in CINAHL, 25 results in PsycINFO, 29 results in PubMed, 415 results in Virginia Henderson Global Nursing e-repository, 265 results in MedNar, and two results in Health Sciences Online. Ten studies were selected to answer the PICO question, and each was independently reviewed. These studies were selected because of several factors: inpatient psychiatric setting, relevance to the desired outcome, and effective, feasible interventions.

Critical Appraisal and Synthesis

Ten studies were retained for this literature review. Retained studies include six longitudinal cohort studies (LCS) and four randomized controlled trials (RCT) (Appendix A). The Melnyk and Fineout-Overholt's (2014) rapid critical appraisal tools were used to evaluate their validity, reliability, and applicability. Eight studies were conducted in the United States, one in Iran, and one in Zambia. Study length ranged from 45-days to three years. All study samples evaluated patients with a substance use disorder, a mental health disorder, or co-occurring substance use and mental health disorder (dual diagnosis). All samples contained patients aged 18 years or older, with some limiting the age group from 18-65 years of age. Studies that defined a comparison group had relatively balanced matching concerning gender. The balanced design was used to control for confounding variables. One study had a skewed sample, which reduces its ability to be generalized (Akerle et al., 2017). The sample being 80% African American, 62% homeless, and 65% male (Akerle et al., 2017). One study did not provide any demographics for the population studied but, because of the setting, some population demographics can be inferred (Zuehlke et al., 2016). Most of the studies address possible limitations, but none reported any bias. Cohort studies have inherent selection bias. All six LCS's are subject to selection bias. The quasi-experimental design allows them to be conducted with or without control/comparison groups. Three of the LCS's do not have a comparison group; and self-identified as quality improvement (QI) projects; however, their goal was to generate new knowledge thus disqualifying them as QI projects. Measured outcomes were readmission rates and the likelihood of readmission which demonstrates objectivity, reduced bias, and higher reliability. Most studies used logistic regression analysis and reported results in the form of an odds ratio (OR). Using logistic regression allowed for greater control over numerous potential

confounders. Also, it strengthens the reliability of the results. The analysis was further supported by significance tests for the models being used. Some studies used several significance tests to ensure a good fit, improving confidence that the statistical model represents the data collected. Two of the randomized controlled trials included in this synthesis have not yet been completed. They are ongoing clinical trials and have been included to demonstrate the relevance and need for this study. They also provide a reference for framework and design.

Conclusion from Evidence

Substance abuse relapse and subsequent readmissions are costly to the individual, healthcare system, and the community. Inpatient stays are often brief, and there is a lack of engagement in outpatient services. The evidence suggests that modifying discharge protocols and incorporating detailed recovery planning can reduce relapse and readmission rates to substance abuse facilities. In the studies that had an experimental and control group, the experimental group consistently demonstrated a decrease in the likelihood/odds of readmission and relapse. Most of the support for this change comes from level III and level II evidence. More randomized controlled trials are needed to build upon current literature and support future studies.

Conceptual Framework & EBP Model

The Neuman systems model (Appendix C) was chosen as the conceptual and theoretical framework as a way to describe interrelated concepts, understand and predict events, and guide the desired impact of the DNP project. Butts & Rich (2018) state that the model provides nursing with a comprehensive, systems-based guide. The model focusses on the response of the client to stressors, and the use of primary, secondary, and tertiary nursing prevention interventions for ideal client wellness. Stressors are disruptive forces and are categorized in three levels: Intrapersonal (occur within the person or family); Interpersonal (occur between individuals and

their roles); and Extra-personal (occur outside the individual) (Butts & Rich, 2018). A person is viewed holistically and consists of five variables: physiological, psychological, sociocultural, developmental, and spiritual. Outcome and treatment planning within the model involves collaboration between the caregiver and the client. Neuman places significant emphasis on wellness and the central role that clients play in setting goals and identifying prevention interventions (Neuman & Fawcett, 2011). Neuman's model is unique because of the inclusion of the perceptions held by the client and the nurse (Butts & Rich, 2018). Interactions between the client and the environment are significant because they can have a positive or negative effect on the other (Neuman & Fawcett, 2011). The effectiveness of the interventions is based on whether the client's goals were met or not met. The studies evaluated did not identify or use Neuman's model, but the framework can be used to understand the synthesized evidence. Increasing patient involvement in treatment and discharge planning was a significant component in many of the studies evaluated. Individualized recovery planning is an example of tertiary prevention and client-centered care, described in Neuman's systems model. Engaging with the client in a detailed and specific manner of how goals are going to be met in various scenarios is preventative.

The *Iowa Model of Evidence-Based Practice to Promote Quality Care* was selected to guide the development of the evidence-based project. It has been used in a variety of settings and includes input from the entire organizational system (Schaffer, Sandau, & Diedrick, 2012). The layout of the *Iowa Model of Evidence-Based Practice to Promote Quality Care* (Appendix D) integrates quality improvement and research utilization. It is a model that nurses find easily understandable (Gawlinski & Rutledge, 2008). Melnyk & Fineout-Overholt (2014) describe it as a step by step process that begins initially with a problem

or knowledge-focused trigger. These triggers highlight the opportunity for improvement and lead to the questioning of current clinical practice standards (Melnik & Fineout-Overholt, 2014). High readmission rates for individuals with SUD were considered to be both a problem and knowledge- focused trigger. The pilot intervention and subsequent evaluation is a crucial step in the process and determines whether the practice change is appropriate and effective (Melnik & Fineout-Overholt, 2014). Lastly, the model expects the dissemination of results to contribute to professional learning. The Iowa model is straightforward and guides clinicians through the EBP process.

The plan for follow-up care was selected based on the holistic view of the Neuman systems model. The goal of the intervention was to more concretely discuss how the patient will connect with resources in the community, in addition to assessing their needs within several domains. The three levels of stressors, described by Neuman, are integrated into the recovery plan by inquiring about personal relationships, roles and expectations, and extra-personal needs. Five of the domains come directly from the Neuman systems model and are: physiological, psychological, sociocultural, developmental, and spiritual. The two remaining domains: transitioning and prevention, are based on Neuman's concept of extra-personal stressors or stressors that occur outside the individual.

Methods

Ethical Considerations and IRB Approval

The evidence-based project was approved by the IRB board affiliated with Arizona State University (ASU) (Appendix E) and required one modification (Appendix F). Protection of human subjects included the creation of a specific participant ID as follows: first letter of first name; favorite color; patient selected two-digit number (e.g. Vgreen12). Participants included in

the study were required to be 18 years of age or older, have a primary diagnosis of a Substance Use Disorder, and completed a minimum of 30 days in treatment without involuntary discharge. Minors, Adults who are unable to consent, Individuals who are unable to read or write in English, and prisoners, were not included. No compensation or credit was given to any participants. The potential benefits of participation in the study include decreased risk of relapse, improved self-efficacy, and reduced risk of readmission. There was no known risk greater than those that are associated with everyday types of activity. Minor psychological discomfort may be experienced during the discussion of difficult personal topics and the recovery plan. If the patient began to feel suicidal or wanted to self-harm, appropriate resources would be given. If at the 72-hour or two-week follow-ups the patient was found to have relapsed or be in crisis, crisis resources would be given. The co-Principal Investigator (PI) met with facility staff to present and explain the study. Staff were provided with the Recruitment Criteria Flyer (Appendix G) and the Patient IRB Consent form and asked to present this information to any potential participants at the facility, which includes contact information for patients to reach the co-PI if they wish to participate. Confidentiality of data was ensured via the use of ASU's Sensitive and Highly Sensitive Information policies and protocols. Electronic data was stored via local storage using VeraCrypt software. Physical data, such as paper surveys were stored in a locked cabinet in the manager's office. Data was linked via a specific participant ID as described above. The Co-PI consented all the participants for the study. The consent process took place over the phone. Consent was inferred and obtained via verbal affirmation and completion of the surveys. Participants were given as much time as needed when deciding whether they would like to participate. Participants were allowed to have all questions answered before participation. Participants were able to state back to the Co-PI requirements for the project.

The intervention consisted of a three-part process: (1) patient develops a recovery plan during treatment using the Self-Management and Recovery Training (SMART) system; (2) 72-hour post-discharge follow-up phone call; (3) two-week post-discharge follow-up phone call. The general plan can be viewed in Appendix (H). During the 72-hour follow-up, participants completed: Time to Relapse Questionnaire (TRQ) (Appendix I), UCLA Loneliness Scale (Appendix J), and a Semi-structured interview (Appendix H). Upon discharge, the patient reviewed the recovery plan that was developed with facility staff. At 72-hours post-discharge, patients received a telephone call to complete the TRQ and UCLA Loneliness scale, review receipt of any medications, discuss any upcoming appointments and barriers, assess the recovery plan's effectiveness thus far, and provide crisis resources if necessary. At two-weeks, post-discharge patients received another phone call to assess the effectiveness of the recovery plan, provide crisis resources if necessary, and complete TRQ and UCLA Loneliness scale.

Instruments

The outcomes measured used qualitative and quantitative data through the use of questionnaires and semi-structured interviews. The Time to Relapse Questionnaire was designed to assess the time from initial thought of drug use to actual use. It is a 9-item scale that classifies results into Sudden Relapse, Short Delay Relapse, or Long Delay Relapse. A higher score in one category indicates the patients predominate relapse style. The TRQ is not in widespread use but demonstrated validity and internal consistency (Adinoff et al., 2010). There are no restrictions for use, approval of its use was obtained by the creator, and it is in the public domain. It will provide quantitative information to answer if the discharge intervention can decrease relapse rates and reduce readmissions. Patient loneliness will also be evaluated, and a separate tool will be used. The University of California, Los Angeles [UCLA] loneliness scale measures subjective

feelings of loneliness and social isolation (Russel, 1996). Three studies demonstrated validity and reliability, and many recent studies have used this tool, further confirming its credibility. The loneliness scale will also provide quantitative data for evaluating if the recovery plan is effective at increasing connectedness in the community. Incorporating an assessment of loneliness and social isolation meets Neuman's' idea of a holistic path to wellness. The semi-structured interviews addressed individual concerns regarding discharge needs and the effectiveness of the intervention. During the interview, barriers to accessing community resources, strategies to overcome barriers, detailed discharge plans, and current needs to facilitate the transition were discussed. The semi-structured interviews provided client perceptions, and according to Neuman, are an essential part of the nursing process when developing treatment plans (Butts & Rich, 2018). The desired outcome is determining the likelihood of substance use relapse and subsequent readmission and the impact of the recovery plan intervention. The demographics tool can be viewed in Appendix (K).

Budget

The proposed budget can be seen in Appendix (L). No funding was received for this study.

Results

Outcomes

Twenty-three individuals were eligible for the study, but only five were reached and participated. Two individuals were unable to be reached at the two-week follow-up mark. Four were left messages but were never reached, twelve had either a wrong phone number or the number was disconnected, and two were still in treatment. This can be seen in the flowchart of participant enrollment and retention (Appendix M). As illustrated in Table (3), (Appendix N)

frequencies and percentages were calculated for Gender, Age_Range, Relationship_Status, and Education. The most frequently observed category of Gender was Male ($n = 3$, 60%). data showed that the sample ($N=5$) had three males (60%) and two females (40%). The most frequently observed category of Age_Range was 30-39 ($n = 4$, 80%), the other participant was within the 21-29 age range. The most frequently observed category of Relationship_Status was Single, never married ($n = 2$, 40%). The most frequently observed category of Education was GED ($n = 2$, 40%). Frequencies and percentages for Outpatient_services, Working, and In_Crisis are presented in Appendix O. At 72 hours, all of the participants reported having some form of outpatient service. The most frequently observed category of Outpatient_services was Y ($n = 5$, 100%). None were considered to be in crisis or need crisis resources. The most frequently observed category of In_Crisis was N ($n = 5$, 100%). 80% of the participants were working. The most frequently observed category of Working was Y ($n = 4$, 80%). Two out of five had concerns about housing. At the two-week follow-up, only three of five were able to be reached. One male and one female. Of the remaining three reached, none were in crisis or needed crisis resources. All were still utilizing outpatient services and were working. One participant still had concerns about housing but already had help in place. The average time length of the phone call at 72hrs was 8.2 minutes and 4.6 minutes at two weeks.

Statistical Significance

The items for UCLA loneliness scale had a Cronbach's alpha coefficient of 0.91, indicating excellent reliability. Appendix (P) presents the results of the reliability analysis. A two-tailed paired samples t -test was conducted to examine the mean difference of UCLA_72hr and UCLA_2week. The result of the two-tailed paired samples t -test was not significant based on an alpha value of 0.05, $t(2) = 1.00$, $p = .423$. A table of the means is presented in Appendix (Q).

A two-tailed paired samples *t*-test was conducted to examine the mean difference of Sudden_72hr and Sudden_2week. The result of the two-tailed paired samples *t*-test was not significant based on an alpha value of 0.05, $t(2) = 1.73, p = .225$. A table of the means is presented in Appendix (R). A two-tailed paired samples *t*-test was conducted to examine the mean difference of Short_72hr and Short_2week. The result of the two-tailed paired samples *t*-test was not significant based on an alpha value of 0.05, $t(2) = -2.00, p = .184$. A table of the means is presented in Appendix (S). A *t*-test for Long_72hr and Long_2week could not be conducted because there were no changes in scores. A linear regression analysis was conducted to assess whether Short_72hr, Sudden_72hr, and Long_72hr significantly predicted UCLA_72hr. The results of the linear regression model were not significant, $F(3,1) = 0.32, p = .825, R^2 = 0.49$, indicating Short_72hr, Sudden_72hr, and Long_72hr did not explain a significant proportion of variation in UCLA_72hr. Since the overall model was not significant, the individual predictors were not examined further. Appendix (T) summarizes the results of the regression model.

The mean difference between scores were as follows: UCLA_72hr ($M = 3.67, SD = 0.58$), UCLA_2week ($M = 3.33, SD = 0.58$), TRQ-Sudden_72hr ($M = 5.33, SD = 2.08$), Sudden_2week ($M = 4.33, SD = 1.15$), TRQ- Short_72hr ($M = 5.00, SD = 1.00$), Short_2week ($M = 5.67, SD = 0.58$), no differences in scores were noted between Long_72hr and Long_2week. This can be viewed in Appendices Q-T. The project was based on Neuman's systems model which measures the effectiveness of an intervention on whether the client's goals were met or not met. Based on this view, the intervention was effective because all participants maintained sobriety. Statements from participants are included below.

Participant 1: Having someone reach out to me was valuable because I felt more supported. I reflected on the questions asked, and I felt good because I saw differences in myself.

Participant 2: The entire program changed my life and I know that I would have relapsed again without it. I was glad to have some additional support, and the follow-ups made sense.

Participant 3: I don't have any concerns about my recovery plan. If I do start thinking about using then I know that I need to go straight to a meeting. It was nice to have someone checking in with me.

Clinical Significance

Although statistical significance was not seen there is valuable clinical significance that can be derived from carefully viewing the project and the data. The mean for UCLA loneliness scale decreased, which may be supported by the qualitative statements, indicating that clients felt more supported. The two participants that were not reached at the two-week mark may be evidence of the rapidly changing status of individuals with substance use disorders. The decrease in mean score of the sudden relapse style and subsequent increase in mean of the short relapse style may indicate that individuals transitioned from a sudden to short style over this time period. This is also supported from qualitative statements indicating that the questions asked on the TRQ caused a self-reflection and influenced the participants thinking and perception. Knowing that the risk of relapse is high, and that individuals are particularly vulnerable early in recovery, clinicians should be aware that additional support is necessary and beneficial. This support also strengthens the therapeutic alliance and sense of connection for individuals; knowing that someone is actively there for them and ready to help. The environment and social networks that

patients return to after treatment may not be supportive of sobriety. It is the responsibility of every healthcare provider to improve this.

Implications for Change & Innovation

Many key stakeholders can benefit from this project and include facilities, administrators, hospital staff, providers, patients, insurance companies, and the healthcare system as a whole. Patients would benefit from effective treatment and improved quality of life. Inpatient facilities and other components of the healthcare system would benefit from reduced costs associated with readmissions. The desired outcome and expected impact for the project was the reduction of relapse and readmission rates for individuals diagnosed with a substance use disorder. The primary goal was to evaluate the effectiveness of an individualized recovery discharge plan review with follow-up care on relapse and readmission rates. Changes at the practice and process level could be that nurses, social workers, or other staff develop the recovery plan with the patients and follow up with them after discharge. Discussing concrete details of how appointments will be met, how medications received, or what actions they might take if faced with cravings. The role may vary based on facility staffing and budget. Ideally, the process of recovery plan review and follow-up care would be done by an individual explicitly hired for that purpose. This would essentially model the role of a Heart Failure coordinator. The project borrowed strategies from the medical model of a heart failure coordinator and applied them to a behavioral health setting, like a “Cross-Pollinator”. The innovative leader may anticipate that reimbursement for substance use disorders may change in the future, because of the high cost, and begin to put systems in place to prepare for that change. Although the cost may be higher in the short term, leaders must look at the long-term goals and outcomes. At a systemic level, individualized recovery plans and intermittent follow-ups can become a standard of care for

patients diagnosed with a SUD. The body of knowledge the project impacts is related to substance use disorders and evidence-based treatment practices that improve care. It will contribute to the current body of literature in support of individualized recovery plans with follow-up care. The project can be used as a model for any facility searching for strategies to reduce the risk of relapse and readmissions in patients with SUD. Several factors stimulated innovation for the project such as the observation of repeat admissions, the unknown process of what happens to the patient after discharge, and the limited ability of services to meet their needs. Providers must understand that individuals going through substance abuse treatment are vulnerable and need continued support. Making treatment recommendations without following through is doing patients a disservice and reflects a limited understanding of the acute and fragile nature of recovery, particularly early on.

Discussion

Limitations

The study had several limitations and challenges. Ideally, more individuals within the treatment facility would have had phone numbers available. Exploring why more phone numbers were not available would be valuable for the facility. It would provide an opportunity to improve upon future projects or services that may benefit from having that information. The process of explaining the study and questionnaires was challenging to complete over the phone. Finding questionnaires that were relatively quick, easy to explain and understand, and demonstrated reliability was a challenging process. Participants may be distracted, pressed for time, or misunderstand information because of this communication modality. This gives reason to interpret the quantitative data with caution. Additionally, it provides opportunity for the development of questionnaires that can be easily used over the phone. Many of the current

questionnaires that assess risk for relapse have 20 or more questions and would be cumbersome to explain over the phone. The sample size is also a severe limitation and may not reflect a larger population.

Conclusion

Substance abuse relapse and readmissions to inpatient facilities are costly to the individual, the community, and the healthcare system. Many treatment modalities can treat addiction and support recovery, but we must improve engagement in these services. If patients never use them, they are totally ineffective. The recovery-focused discharge plan with follow-up care can reduce readmission rates to inpatient facilities, decrease healthcare costs, and improve patient health outcomes. Further research is recommended to evaluate and identify best practices regarding recovery plan development and follow-up care for individuals with substance use disorders.

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Appendix A Quantitative Studies

Table 1

Evaluation Table

Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
<p>Akerele et al., (2017). Reducing readmission rates in inpatient settings.</p> <p>Funding: None stated</p> <p>Bias: Inferred selection bias. No stated conflict.</p> <p>Country: United States</p>	<p>It is inferred to be a Maximum-likelihood theory based on the use of the likelihood ratio and odds ratio.</p> <p>Logistic regression model.</p> <p>Inferred Health Promotion Model</p>	<p>Quantitative</p> <p>Design: Longitudinal Cohort Study. Quasi-experimental design.</p> <p>Purpose: To evaluate the efficacy of EBP interventions such as Re-Engineered Discharge (RED) and patient navigators on RAR.</p>	<p>n: 1,707</p> <p>CG: N/A</p> <p>EG: 1,707</p> <p>Setting: A community IP psychiatric unit in Brooklyn, NY.</p> <p>Demographics: 18-65 yrs old; hospitalized b/t September 2015 and August 2016; 80% AA, 11 % HSP, 62% homeless</p>	<p>IV: RED and use of patient navigators. The intervention includes a face-to-face “Warm Hand-off,” prior authorization with insurance before DC, provision of medications on DC, f/u phone call within 72hrs, weekly call by Patient Navigator for up to 30 days.</p>	<p>Pre-INT RAR calculated from September 2014- August 2015.</p> <p>Post-INT RAR calculated from September 2015- August 2016.</p>	<p>Simple logistic regression analysis. Likelihood ratio test. SAS used.</p> <p>CI: 0.05 or 95%</p>	<p>Odds of readmission post-INT was 29.1% lower. OR = 0.71. p-value = 0.004.</p> <p>RAR reduced by 27%.</p>	<p>LOE: III</p> <p>Strength: INT was significant in reducing RAR.</p> <p>Weakness: No control group. Retrospective study.</p> <p>Conclusion: Detailed intervention and significant findings.</p>

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
<p>Hutchison et al., (2018). Care management intervention to decrease psychiatric and substance use disorder readmissions in Medicaid-enrolled adults</p> <p>Funding: None stated</p> <p>Bias: Inferred selection bias. No stated conflict.</p> <p>Country: United States</p>	<p>NS It is inferred to be a Maximum-likelihood theory based on the use of the likelihood ratio. Logistic regression model.</p> <p>Inferred Health Promotion Model</p>	<p>Quantitative</p> <p>Design: Quality improvement; Quasi-experimental- Time series design (higher selection bias).</p> <p>Purpose: To improve the use of OP resources and reduce hospital RAR.</p>	<p>N: 1,724</p> <p>n CG: 481</p> <p>n EG: 1243</p> <p>Sample data were collected from 76 MH organizations across Pennsylvania. February 1, 2015- December 31, 2016.</p> <p>Setting: IP substance abuse and residential detox facilities</p> <p>Demographics: -18-64yrs</p>	<p>IV: 15-30-minute recovery-focused interview + usual care. The interview focused on eight topics: reasons for current readmission, barriers to increasing community tenure, strategies to overcome barriers, plans for DC, strategies for accessing and using medications, use of recovery plan, factors</p>	<p>RAR based on MH service paid claims data.</p>	<p>Chi-square test. H-L (p= 0.99) and Cox & Snell R2 (0.03) for goodness of fit. Logistic regression analysis. SAS 9.3.</p> <p>CI: .05 or 95%</p>	<p>RAR in EG = 4% compared to 7% in CG. Follow up rates to OP care, EG = 32%, CG = 25%. The odds of readmission for patients with DD were 1.7x (OR) higher than those with an MH or SUD only.</p> <p>SD = N/A</p>	<p>LOE: III</p> <p>Application to practice</p> <p>Strength: Large sample size. Specific intervention. The statistical model reflects the desired outcome/measurement.</p> <p>Weakness: No randomization and limited observed variables. Higher selection bias. Cohort study.</p> <p>Conclusion: Current SUD or</p>

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

			<p>-Readmission to a psych facility, IP SUD facility, or residential detox within 30 days of a prior admission. Multiple prior IP treatment & detox services.</p> <p>CG: Ma-64.9%, EA-77.5%, DD-73.2%</p> <p>EG: Ma-59.7%, EA-76.8%, DD-74.6%</p>	<p>for personal safety, and IP needs for transition to the community.</p> <p>DV: Usual care; defined as DC planning, referral to OP resources, care-management supports, and community services. This group did not receive the recovery interview.</p>				<p>detox services do not provide much time for adequate and effective DC planning. This intervention may help to bridge that gap. Results demonstrate improvement in RAR. Would be feasible.</p>
Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
<p>Koval et al., (2016). Implementation of recovery programming on an inpatient</p>	<p>Plan-Do-Study-Act (PDSA) Model. PDSA model is effective</p>	<p>Quantitative</p> <p>Design: Quality improvement; Quasi-experimental-</p>	<p>n: 1</p> <p>n CG: N/A</p> <p>n EG: N/A</p>	<p>IV: 38-page veterans recovery self-help book and worksheet. Recovery</p>	<p>RAR. The “Readmission rate by discharge diagnosis related group for thirty-day time frame”</p>	<p>Percentages of readmissions to the IP unit were evaluated at</p>	<p>Pre-intervention RAR= 13%. (1 year, 2013) Post</p>	<p>LOE: III</p> <p>Application to practice</p>

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

<p>acute psychiatric unit and its impact on readmission.</p> <p>Funding: Office of Academic Affiliations</p> <p>Bias: Inferred selection bias. No stated conflict.</p> <p>Country: United States</p>	<p>for quality improvements.</p> <p>Recovery-oriented model.</p>	<p>Time series design (higher selection bias).</p> <p>Purpose: To evaluate the impact of a recovery program on RAR.</p>	<p>Setting: 16 bed acute psychiatric IP unit</p> <p>Demographics: Pts with mental health diagnoses. No other demographics used.</p> <p>CG: N/A</p> <p>EG: N/A</p>	<p>principles added to Kardex and nursing report sheet. Daily unit schedule changed to 4 hours of recovery programming.</p>	<p>report was used to gather information from this specific VA medical center. “Admissions, discharges, and transfers” report was used for data comparison. Data gathered from the U.S. Department of VA</p>	<p>three different times: 2013, 2014, and 2015.</p> <p>Initial data collected prior to intervention .</p>	<p>intervention RAR = 9.0% (2 year, 2014) post intervention RAR= 7.4% (3 year, 2015)</p> <p>SD = N/A</p>	<p>Strength: Data was collected over a three Yr period. A steady decrease in RAR.</p> <p>Weakness: No control group. Quality improvement study. Potential for many confounding variables. No demographics/patient information was obtained. No info was shared from IP to OP treatment providers. No demographics. Limited quantitative analysis of data.</p> <p>Conclusion: Results indicate a reduction in RAR but because the</p>
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Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between CAU- Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
<p>Maarefvand et al, (2015). Community-based relapse prevention for opiate dependents (CBRP): A randomized community-controlled trial.</p> <p>Funding: Rebirth Society.</p> <p>Bias: Blinding not possible. No stated conflict.</p> <p>Country: Iran</p>	<p>None stated. Inferred Health Promotion Model</p>	<p>Design: Double-arm randomized controlled trial</p> <p>Purpose: To evaluate the effectiveness of a relapse prevention intervention among opiate-dependent patients.</p>	<p>n: 71 n CG: 36 n EG: 35</p> <p>Setting: Seven short-term residential abs-based treatment centers.</p> <p>Demographics: 18yrs or older. Successful completion of a 28-day residential abs</p>	<p>IV: CBRP consists of five components: patient and family engagement (MI), community assessment, community mobilization, organizing community team, and CBRP planning. CBRP intervention plus f/u phone calls for 3-</p>	<p>Family and social support questionnaire. BIOSENS- rapid on-site testing to determine the amount and type of narcotic at 45 and 90 days post-discharge.</p>	<p>T-test analysis comparing demographics of CG v EG. Variables: age, education, age of abuse initiation.</p> <p>Results from the drug tests were considered the main outcome. Analyzed</p>	<p>CG: 45 days post DC maintained abs: 41.7%, 90 days: 44.4%. Nearly all in CG relapsed within 45 days post DC.</p> <p>EG: 45 days post DC maintained abs: 77.1%, 90 days: 77.1%</p>	<p>design is not strong, confidence is limited. The specific intervention allows for feasibility.</p> <p>LOE: II</p> <p>Application to practice</p> <p>Strength: Detailed INT. RCT. Evaluated two different time intervals. The study supports literature with similar INT.</p> <p>Weakness: Potential for many confounding variables. Limited</p>

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

			program. DSM-IV criteria for opiate dependence. CG: EG:	months post-DC. DV: F/U services as usual + F/U phone calls 3-months post-DC.		using Chi square tests. CI: .05 or 95%. Two-tailed test. Qualitative data via interviews w/ community members.	SD = N/A	demographic data provided. Conclusion: Demonstrates benefits of detailed plans and community involvement. The scope of INT is vast and involves many components that may make it difficult to implement and control variables.
Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
Navigation Services to Avoid Rehospitalization (NavSTAR) - Full-Text View - ClinicalTrials.gov. (n.d.).	Andersen’s theoretical model of health service utilization.	Design: Randomized controlled trial Purpose: To compare the effectiveness of Navigation Services to Avoid Rehospitalization	n: 400 CG: N/A EG: N/A Setting: Large urban hospital. Demographics: 18yrs or	IV: The Patient Navigator will work with patients for up to 3 months post-hospital discharge to resolve internal barriers (e.g.,	Time to rehospitalization and 30-day RAR.	N/A	N/A	LOE: II Strength: Detailed intervention. RCT. Demonstrates need to improve RAR.

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

<p>Funding: Friends Research Institute, Inc.</p> <p>Bias: N/A</p> <p>Country: United States</p>		<p>n (NavSTAR) vs. Treatment-as-usual (TAU) for patients with co-occurring medical problems and SUD.</p>	<p>older, current SUD diagnosis.</p>	<p>ambivalence about treatment; low motivation; competing life demands, etc.) and external barriers (e.g., lack of transportation; lack of ID card, etc.) to appropriate utilization and engagement in addiction treatment and medical care. Interventions include motivational interventions and patient navigation with proactive case management, tailored to participants' specific needs.</p>				<p>Weakness: Study is still in progress, so no data on the effectiveness of the intervention is available.</p> <p>Conclusion: Pt navigators f/u for three months which would be difficult.</p>
<p>Citation</p>	<p>Theory/</p>	<p>Design/ Method</p>	<p>Sample/ Setting</p>	<p>Major Variables & Definitions</p>	<p>Measurement/ Instrumentation</p>	<p>Data Analysis</p>	<p>Findings/ Results</p>	<p>Decision for Use</p>

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

	Conceptual Framework/ Model							
<p>National Center for Alcohol Research and Education (NCARE): Transition to Recovery - Full-Text View - ClinicalTrials.gov. (n.d).</p> <p>Funding: University of Colorado, Denver</p> <p>Bias: N/A</p> <p>Country: United States</p>	None stated.	<p>Design: Randomized controlled trial</p> <p>Purpose: To evaluate the effectiveness of patient navigation for increasing enrollment in SUD programs and preventing readmission.</p>	<p>n: 700</p> <p>CG: N/A</p> <p>EG: N/A</p> <p>Setting: Unknown</p> <p>Demographics: 18yrs or older.</p>	<p>IV: A single 45-60 minute 1:1 session of MI provided by patient navigators at discharged focused on transitioning patients to treatment after detoxification plus patient navigation for 30 days, or until the patient is successfully enrolled in substance abuse treatment, or readmission to detoxification occurs, whichever occurs first.</p>	Transition to substance abuse treatment and readmission to detoxification.	N/A	N/A	<p>LOE: II</p> <p>Strength: Detailed intervention. RCT. Demonstrates need to improve RAR.</p> <p>Weakness: The study is still in progress, so no data on the effectiveness of the intervention is available.</p> <p>Conclusion: Intervention may be too lengthy therefore more challenging to implement.</p>
Citation	Theory/	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

	Conceptual Framework/ Model							
<p>Shaffer et al., (2015) Brief critical time intervention to reduce psychiatric rehospitalization</p> <p>Funding: Community Care Behavioral Health Organization</p> <p>Bias: Inferred selection bias. No stated conflict.</p> <p>Country: United States</p>	<p>NS</p> <p>It is inferred to be a Maximum-likelihood theory based on the use of the likelihood ratio. Logistic regression model.</p> <p>Inferred Health Promotion Model</p>	<p>Quantitative</p> <p>Design: Quasi-experimental investigation; Time series design (higher selection bias).</p> <p>Purpose: The purpose of the study was to examine the association between BCTI and its impact on RAR.</p>	<p>n: 373</p> <p>n CG: 224</p> <p>n EG: 149</p> <p>Setting: Six community based behavioral health organizations.</p> <p>Demographics: >18yrs old DD</p> <p>CG: Ma-48%, Fe-52%; AA-43%, CAU-56%</p> <p>EG: Ma-57%, Fe-43%; AA-42%, CAU-56%</p>	<p>IV: brief critical time intervention (BCTI). BCTI was broken into three phases of implementation. Phase 1: Assessment of immediate needs and resources. Phase 2: connection to community resources. Phase 3: Transition from ASC to community MH services.</p>	<p>RAR</p>	<p>Chi-square test. H-L (p= 0.87) and Cox & Snell R2 (0.06) for goodness of fit. Logistic regression analysis. SAS 9.3.</p> <p>CI: .05 or 95%</p>	<p>RAR days 1-30: 28% was EG, CG was 47%. RAR for days 31-180: EG: 44%, CG: 52%</p> <p>Those in CG were 2.83x (OR) more likely to be readmitted (p< .001).</p> <p>SD = N/A</p>	<p>LOE: III</p> <p>Application to practice</p> <p>Strength: Detailed INT. Similar, well-defined sample in regards to CG & EG. Evaluated RAR at two different time intervals. The statistical model reflects the desired outcome/measurement.</p> <p>Weakness: Use of small sample and non-randomized quasi-experimental design. Cohort study. Higher selection bias.</p>

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								Conclusion: Person-centered approach leads to better outcomes. BCTI is effective for reducing early readmissions. Feasible.
Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
Sheikh et al., (2017). Impact of brief relapse prevention intervention in patients with alcohol dependence in Zambia. Funding: None reported. Bias: None reported.	Inferred Health Promotion Model Community reinforcement approach	Quantitative Design: Randomized controlled trial Purpose: Evaluate the effectiveness of a brief relapse prevention intervention.	n: 114 n CG: 56 n EG: 58 Setting: Chainama Hills Hospital. (Alcohol-use d/o leading cause of admission) Demographics: Meet DSM-	IV: Treatment as usual + a brief relapse prevention intervention from the WHO mhGAP (education, brief motivational interviewing, involving friends and family) DV: Treatment as usual which	Audit score at intake and 8 weeks post-dc.	SPSS V. 20. No other data analysis provided.	EG: average time to first drink 51 days. CG: average time to first drink 10 days. Average audit score for	Strengths: Brief 20-minute interview that requires minimal training to administer. Pre and post intervention scores measured. Limitations: Sample was predominately male. Sample may not be indicative of those who have

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<p>Country: Zambia</p>			<p>IV criteria for SUD. 96.5%- M, 18-65yrs old, 53.5%- Single.</p> <p>CG:</p> <p>EG:</p>	<p>was detoxification with diazepam and vitamin supplementation.</p>			<p>frequency of etoh intake at 8 week f/u: EG: 1.3, CG: 8.9.</p> <p>P<.001</p>	<p>limited family support (all had family support).</p>
<p>Citation</p>	<p>Theory/ Conceptual Framework/ Model</p>	<p>Design/ Method</p>	<p>Sample/ Setting</p>	<p>Major Variables & Definitions</p>	<p>Measurement/ Instrumentation</p>	<p>Data Analysis</p>	<p>Findings/ Results</p>	<p>Decision for Use</p>
<p>Taylor et al., (2014) Effectiveness of a brief care management intervention for reducing psychiatric hospitalization readmissions.</p> <p>Funding: Community Care Behavioral Health Organization</p> <p>Bias: Inferred selection bias.</p>	<p>It is inferred to be a Maximum-likelihood theory based on the use of the likelihood ratio. Logistic regression model.</p> <p>Inferred Health Promotion Model</p>	<p>Design: Longitudinal Cohort Study. Quasi-experimental design.</p> <p>Purpose: To increase engagement in aftercare and reduce early psychiatric admissions.</p>	<p>n: 195 CG: 108 EG: 87 Setting: Large psychiatric IP specialty hospital</p> <p>Demographics : Medicaid-eligible adults readmitted to IP psychiatric care within 30 days prior.</p>	<p>IV: Recovery-focused bridging strategy which was a one-time interview lasting about 10-20 minutes. Six areas were discussed: the reason for admission; barriers to increasing community tenure; strategies to overcome barriers; crisis</p>	<p>RAR</p> <p>Sociodemographic information and MH service utilization was obtained through administrative data and paid MH claims.</p>	<p>Chi-square test. H-L (p= 0.08) and Cox & Snell R2 (0.27) for goodness of fit. Logistic regression analysis. SAS 9.3.</p> <p>CI: .05 or 95%</p>	<p>CG was 2.44x more likely to be readmitted than those in EG.</p>	<p>LOE: III</p> <p>Application to practice</p> <p>Strength: Detailed INT. The study supports literature with similar INT.</p> <p>Weakness: Data collection from one IP facility. Limited demographic. No</p>

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No stated conflict. Country: United States			18-64yrs old Admissions between April 2011- November 2012 CG: 54% M, 57% CAU, EG: 46% M, 62% CAU	plan development; factors to keep individual safe; and current needs that would assist with the transition. DV: usual care; defined as DC planning, referral to OP resources, care-management supports, and community services. This group did not receive the recovery interview				randomization of the sample. Conclusion: Brief care management is effective in reducing RAR. The study is cost effective and easy to implement.
Citation	Theory/ Conceptual Framework/ Model	Design/ Method	Sample/ Setting	Major Variables & Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Results	Decision for Use
Zuehlke et al., (2016). Transformation to a recovery-	Recovery-oriented model	Quantitative Design: Quality improvement;	n: 352 n CG: N/A	IV: Interdisciplinary recovery team meetings	Outcome measures were: Staff satisfaction, restraints/	Independent samples T-tests to assess for	RAR: p= 0.75.	LOE: III Application to practice.

Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS -** Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS -** Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR -**Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s –** Year/s

<p>oriented model of care on a veterans' administration inpatient unit.</p> <p>Funding: No funding information provided.</p> <p>Bias: Inferred selection bias. No stated conflict.</p> <p>Country: United States</p>	<p>Inferred Health Promotion Model</p>	<p>Quasi-experimental-Time series design (higher selection bias).</p> <p>Purpose: Examine the impact of recovery interventions on Pt outcomes and IP RAR.</p>	<p>n EG: N/A</p> <p>Setting: 15-bed acute psychiatric unit</p> <p>Demographics: Veterans admitted to psychiatric IP unit.</p> <p>CG: None provided.</p> <p>EG: None provided.</p>	<p>and unit community meetings (pt.'s also had input); Staff recovery intervention education; Direct patient treatment planning; Recovery-oriented group programming; Peer support via CPS.</p>	<p>seclusion use, and RAR (data collected via chart review).</p>	<p>changes b/t baseline and intervention . Repeated measures univariate ANOVA. SPSS.</p>	<p>Staff satisfaction: p= 0.001. Restraints: p= 0.03</p> <p>RAR:</p> <p>SD = 2.32 (baseline)</p> <p>SD = 1.40 (intervention periods)</p>	<p>Strength: Data was collected over one year. Detailed intervention.</p> <p>Weakness: Lack of experimental CG. Quality improvement project. Potential for many confounding variables. No demographics/patient information was obtained. No change in RAR. Limited quantitative analysis of data.</p> <p>Conclusion: INT was very detailed; however, data were inconclusive related to its impact on RAR.</p>
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Key: AA- African American; **Abstinence-** abs; **ANOVA-** analysis of variance; **ASC-** acute service coordination; **BCTI-** brief critical time intervention; **B/T-** between **CAU-** Caucasian; **CG-** control group; **CI-** confidence interval; **CPS-** certified peer specialist; **DC-** discharge; **DD-**Dual Diagnosis (both MH and SUD diagnosis); **DO-**disorder; **DV-**dependent variable; **EA-** European American **EG-** experimental group; **Fe-** female; **F/U-** follow-up; **HSP-** Hispanic; **H-L-** Hosmer-Lemeshow; **INT-** intervention; **IP-** inpatient; **IV-** independent variable; **Ma-**male; **MH-** mental health; **MHGAP-** mental health general action plan; **MI-** motivational interview; **N-**number of studies (if SR) or participants in study; **n-** number of participants (if SR) or number of participants in subset; **N/A-** not applicable or not available; **NavSTAR-** Navigation Services to Avoid Rehospitalization; **NCARE-** Native Center for Alcohol Research and Education; **Pt-** patient; **SAS** - Statistical Analysis Software; **SD-** standard deviation; **SUD-** substance use disorder; **SPSS** - Statistical Package for the Social Sciences; **VA-** Veterans affairs; **OP-** outpatient; **OR-** odds ratio **RAR** -Readmission rates; **RCT-** Randomized controlled trial; **RED-** Re-Engineered Discharge; **WHO-** world health organization; **Yr/s** – Year/s

Appendix B Quantitative Studies

Table 2

Synthesis Table

Basics											
Author	Akerele et al.	Hutchison et al.	Koval et al.	Maarefvand et al.	NavSTAR	NCARE	Shaffer et al.	Sheikh et al.	Taylor et al.	Zuehlke et al	
Year	2017	2018	2016	2015	(n.d.)	(n.d.)	2015	2017	2014	2016	
Design/ LOE	LCS/ III	LCS/ III	LCS/ III	RCT/II	RCT/ II	RCT/ II	LCS/ III	RCT/II	LCS/ III	LCS/ III	
Study Characteristics											
Sample Size	1,707	1,724	N/A	71	400	700	373	114	195	352	
Age	18-65yrs	18-64yrs	N/A	18yrs +	18yrs +	18yrs +	18yrs +	18-65	18-64yrs	N/A	
Bias	LR	LR	MR	LR	N/A	N/A	LR	LR	LR	MR	
Interventions											
Pt navigator	X				X	X					
Recovery plan	X	X	X	X	X		X	X	X	X	
RF interview		X		X	X	X		X	X		
IND RP added to nursing report			X								
MI		X		X	X	X		X			
Direct Pt TP		X								X	
Pt education	X		X	X			X	X		X	
Major Findings											
OOR pre-INT					N/A	N/A					

Key: IND- Individual; LCS- Longitudinal cohort study; LOE- Level of evidence; LR- Low risk; MI- Motivational interview; MR- Moderate risk; N/A- Not available/ applicable; NS- Not significant; OOR- Odds of readmission; Pt- Patient; RAR; Readmission rates RCT- Randomized controlled trial; RF- Recovery focused; RP- Recovery principles; TP- Treatment planning; Yrs- years;

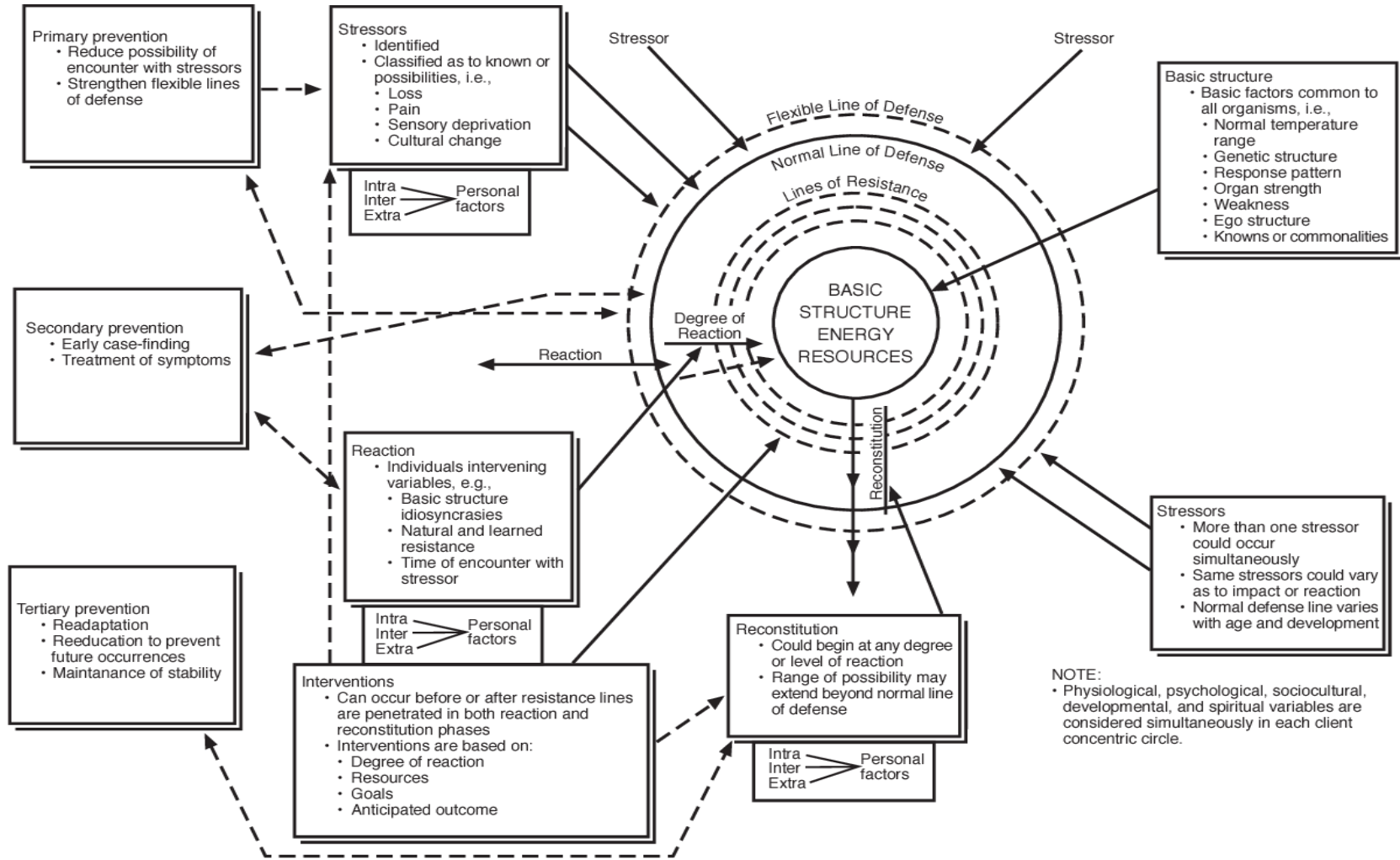
OOR post-INT	↓		↓	↓	N/A	N/A	↓		↓	NS		
RAR	↓	↓	↓		N/A	N/A	↓			NS		
Likelihood oof relapse												

Key: **IND-** Individual; **LCS-** Longitudinal cohort study; **LOE-** Level of evidence; **LR-** Low risk; **MI-** Motivational interview; **MR-** Moderate risk; **N/A-** Not available/ applicable; **NS-** Not significant; **OOR-** Odds of readmission; **Pt-** Patient; **RAR;** Readmission rates **RCT-** Randomized controlled trial; **RF-** Recovery focused; **RP-** Recovery principles; **TP-** Treatment planning; **Yrs-** years;

Appendix C

Figure 1

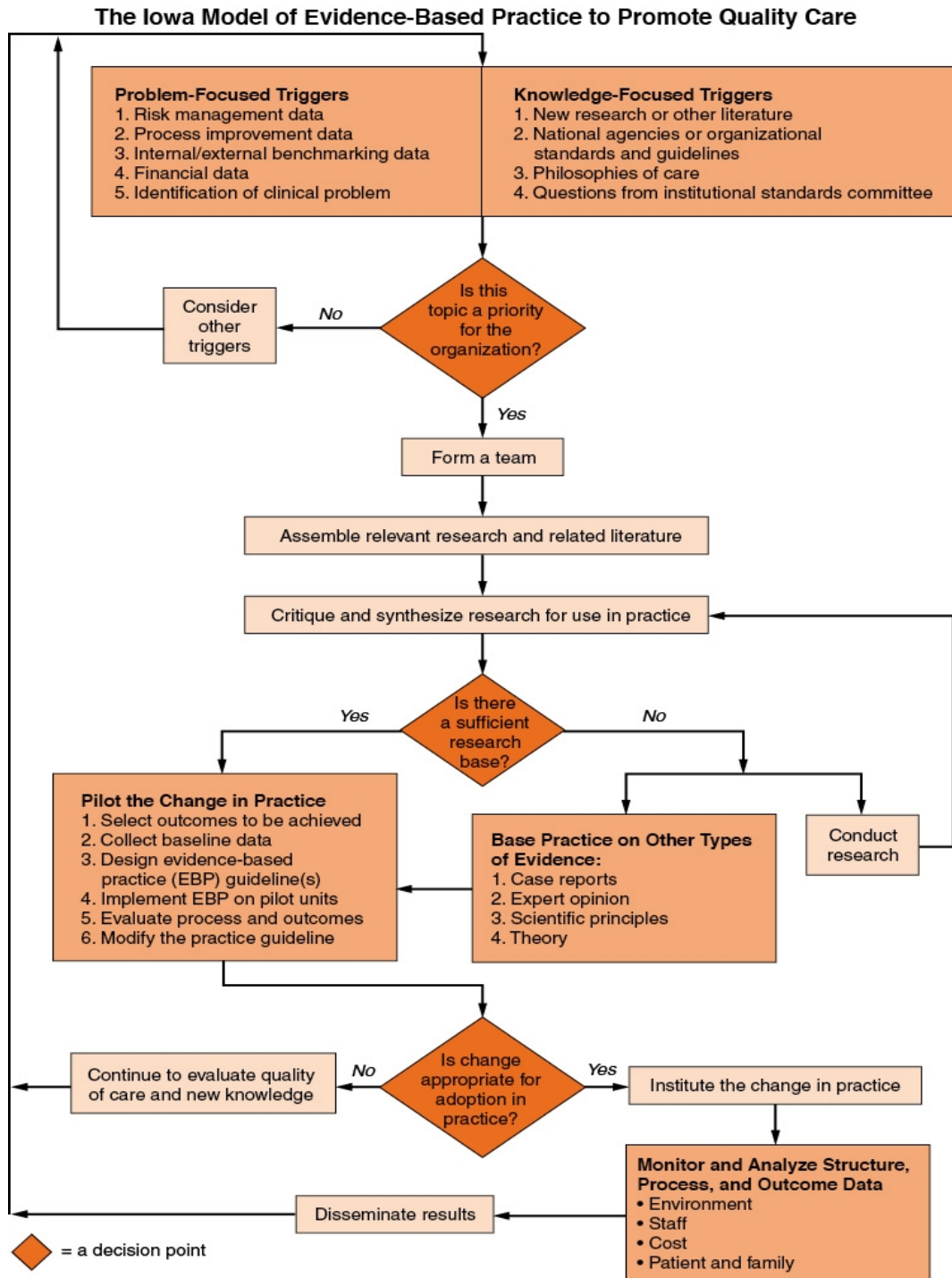
The Neuman systems model



Appendix D

Figure 2

The Iowa Model of Evidence-Based Practice to Promote Quality Care



Appendix E

Document 1

Internal Review Board Approval



APPROVAL: EXPEDITED REVIEW

[Ann Guthery](#)
[EDSON DNP](#)
 602/496-0794
Ann.Guthery@asu.edu

Dear [Ann Guthery](#):

On 9/29/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Substance Use Disorder Relapse and Readmissions
Investigator:	Ann Guthery
IRB ID:	STUDY00010651
Category of review:	(7)(a) Behavioral research
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • BBHH Approval Letter, Category: Other (to reflect anything not captured above); • CITI Certificate, Category: Other (to reflect anything not captured above); • Demographic Survey, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Brief Addiction Monitor, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • UCLA Loneliness Scale, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Participant Contact Information, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Detailed Recovery Plan, Category: Participant materials (specific directions for them); • QI General Plan, Category: Technical

	materials/diagrams; • Recruitment Criteria Flyer, Category: Recruitment Materials; • Social Behavioral Protocol Form, Category: IRB Protocol; • Semi-Structured Interview, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Consent Form, Category: Consent Form;
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The IRB approved the protocol from 9/29/2019 to 9/28/2020 inclusive. Three weeks before 9/28/2020 you are to submit a completed Continuing Review application and required attachments to request continuing approval or closure.

If continuing review approval is not granted before the expiration date of 9/28/2020 approval of this protocol expires on that date. When consent is appropriate, you must use final, watermarked versions available under the “Documents” tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Vincent Ekstrom
 Vincent Ekstrom

Appendix F

Document 2

Internal Review Board Modification Approval



APPROVAL: MODIFICATION

[Ann Guthery](#)
 EDSON, DNP
 602/496-0794
 Ann.Guthery@asu.edu

Dear [Ann Guthery](#):

On 12/27/2019 the ASU IRB reviewed the following protocol:

Type of Review:	Modification / Update
Title:	Substance Use Disorder Relapse and Readmissions
Investigator:	Ann Guthery
IRB ID:	STUDY00010651
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • Consent Form, Category: Consent Form; • Crisis Protocol, Category: Resource list; • Participant Contact Information, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • QI General Plan, Category: Technical materials/diagrams; • Recruitment_Criteria_Flyer_V4.pdf, Category: Recruitment Materials; • Site Approval Letter, Category: Other; • Social Behavioral Protocol Form, Category: IRB Protocol; • UCLA 3 Item Loneliness Scale, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);

The IRB approved the modification.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Vincent Ekstrom
Vincent Ekstrom

Appendix G

Document 3

Participant Recruitment Letter

Dear Potential Participant,

Arizona State University is conducting a quality improvement project within Crossroads titled Substance Use Disorder Relapse and Readmissions. The goal of the project is to reduce the risk of relapse and readmissions to the hospital. The potential benefits of participation in the study include decreased risk of relapse, improved self-efficacy, and reduced risk of readmission. As part of the project, participants will be asked to complete and participate in several surveys and interviews at 72-hours and two-weeks post-discharge. This information will be used to identify trends in relapse and readmission so the organization can proactively address essential needs and better serve patients with this diagnosis. The general project plan is as follows:

1. 72 hours post-discharge

- a. Follow up telephone call (est. 12 minutes)
 1. Time to Relapse (TRQ) (est. 3 minutes)
 2. UCLA Loneliness Scale (est. 1 minutes)
 3. Semi-structured interview (est. 8 minutes)

2. Two-weeks post-discharge

- a. Follow up telephone call (est.
 1. Semi-structured interview (est. 3 minutes)
 2. Time to Relapse (TRQ) (est. 3 minutes)
 3. UCLA Loneliness Scale (est. 1 minutes)

Risks: There are no physical, legal, or economic risks associated with this study. Minor psychological discomfort may be experienced during the discussion of difficult personal topics and the recovery plan.

Required criteria to be eligible for participation:

- Primary Diagnosis of any Substance Use Disorder
- 18yrs of age or older
- English speaking

* If you wish to participate please contact: Vincent Ekstrom BSN, RN, Graduate Student 480-208-3900

Appendix H

Document 4

Quality Improvement General Timeline

Data Collection Form Timeline

A. 72-hour post-discharge (est. 12 min)

1. UCLA-3 item loneliness scale (est. 1 min)
2. Time to Relapse Questionnaire (est. 3 min)
3. Review of medications. (est. 1 min)
 - a. Have you filled/picked up any medications that you were taking?
 1. Do you anticipate barriers to getting them?
4. Outpatient appointment reminder and review of barriers to keeping it. (est. 2 min)
 - a. Do you have any upcoming appointments?
 1. Do you anticipate any barriers to keeping it?
 2. What mode of transportation will you use to get to the appointment?
 3. How long will it take for you to get there?
5. Recovery plan effectiveness. (est. 2 min)
 - a. Has the recovery plan you developed been effective thus far? If not, what needs to be changed?
6. Provide resources/recommendations. (est. 1 min)
 1. Inpatient treatment
 2. Intensive outpatient
 3. Outpatient
 4. Community resources (See crisis plan)
7. Discuss any questions or concerns regarding patients' sobriety. (est. 1 min)
8. Inform of two-week follow-up call. (est. 1min)

B. Two weeks post-discharge- Follow-up phone call (est. 10 min)

1. Has the recovery plan you developed been effective thus far? If not, what needs to be changed? (est. 2 min)
2. Discuss any questions or concerns regarding patients' sobriety. (est. 1 min)
3. UCLA-3 item loneliness scale (est. 1 min)
4. Time to Relapse Questionnaire (est. 3 min)

Appendix I

Document 5

UCLA Loneliness Scale

Supplemental Information:
Social Isolation

About the Measure	
Domain:	Psychosocial
Measure:	Social Isolation
Definition:	This is a scale used to assess feelings of loneliness or social isolation.

About the Protocol	
Protocol Name from Source:	Three-Item Loneliness Scale
Description:	The Three-Item Loneliness Scale is an interviewer-administered questionnaire developed from the Revised UCLA Loneliness Scale. Each question is rated on a 3-point scale: 1 = Hardly Ever; 2 = Some of the Time; 3 = Often. All items are summed to give a total score.
Protocol:	<p>Three-Item Loneliness Scale</p> <p>Lead-in and questions are read to respondent. The next questions are about how you feel about different aspects of your life. For each one, tell me how often you feel that way.</p> <p>1. First, how often do you feel that you lack companionship: Hardly ever, some of the time, or often? 1 <input type="checkbox"/> Hardly Ever 2 <input type="checkbox"/> Some of the Time 3 <input type="checkbox"/> Often</p> <p>2. How often do you feel left out: Hardly ever, some of the time, or often? 1 <input type="checkbox"/> Hardly Ever 2 <input type="checkbox"/> Some of the Time 3 <input type="checkbox"/> Often</p> <p>3. How often do you feel isolated from others? (Is it hardly ever, some of the time, or often?) 1 <input type="checkbox"/> Hardly Ever 2 <input type="checkbox"/> Some of the Time 3 <input type="checkbox"/> Often</p> <p>Scoring:</p> <p>Sum the total of all items. Higher scores indicate greater degrees of loneliness.</p>
Selection for Inclusion in Supplemental Information:	The Three-Item Loneliness Scales provides a quick and succinct method to collect information about social Isolation. However, the psychometric properties of these items have not been sufficiently studied. Therefore this protocol is more appropriate for inclusion as Supplemental Information instead of in the Toolkit.
Source:	Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A

Supplemental Information:
Social Isolation

	short scale for measuring loneliness in large surveys: Results from two population-based studies. <i>Research on Aging</i> , 26(6), 655–672.
Language:	English
Participant:	Ages 18 years and older
Personnel and Training Required:	The interviewer must be trained to conduct personal interviews with individuals from the general population and found competent to administer these particular questions (i.e., tested by an expert) at the completion of this training. The interviewer should be trained to prompt respondents further if a "don't know" response is provided.
Equipment Needs:	These questions can be administered in a computerized or noncomputerized format (i.e., paper-and pencil instrument). Computer software is necessary to develop computer-assisted instruments. The interviewer will require a laptop computer/handheld computer to administer or to allow the respondent to self-administer a computer-assisted questionnaire.
General References:	Chen, J. H., Waite, L. J., & Lauderdale, D. S. (2016). Marriage, relationship quality, and sleep among U.S. older adults. <i>Journal of Health and Social Behavior</i> , 56(3), 356–377. Mezuk, B., Choi, M., DeSantis, A. S., Rapp, S. R., Diez Roux, A. V., & Seeman, T. (2016). Loneliness, depression, and inflammation: Evidence from the Multi-Ethnic Study of Atherosclerosis. <i>PLoS One</i> , 11(7), e0158056. Russell, D. (1996). The UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. <i>Journal of Personality Assessment</i> , 66, 20–40.
Mode of Administration:	Interviewer-administered questionnaire
Process and Review:	Expert Review Panel 4 (ERP 4) reviewed the measures in the Neurology, Psychiatric, and Psychosocial domains. Guidance from ERP 4 included the following: <ul style="list-style-type: none"> • Added new Supplemental Information

Appendix J

Document 6

Time to Relapse Questionnaire

Date: _____

ID: _____

TRQ

We are interested in gaining a better understanding of what happens when people stop using drugs and then start using them again. We would like to ask some questions about what happens when you have been abstinent for a while and then start using drugs again. Please think about the last few times you have voluntarily stopped using all drugs for at least one week. The following questions will explore the time leading up to your relapse.

Please think about each statement below and decide whether it is an accurate statement about you. Circle one answer for each item. Be sure to answer every question.

	False	Slightly True	Mainly True	Very True
1. I never know ahead of time if I'm going to start using again.	F	ST	MT	VT
2. I crave for less than one hour before I start using drugs again.	F	ST	MT	VT
3. I plan for several days before I start using drugs again.	F	ST	MT	VT
4. I never know I will be using drugs again until it happens.	F	ST	MT	VT
5. I think about using drugs for more than a day before I start using again.	F	ST	MT	VT
6. I think about using drugs for less than an hour before I start using again.	F	ST	MT	VT
7. I crave for less than one day before I start using again.	F	ST	MT	VT
8. When I start using drugs again, it's not planned.	F	ST	MT	VT
9. I think a lot about using drugs before I start using again.	F	ST	MT	VT

TRQ 9 Question Scoring

Item# Item Content

Sudden Relapse

1. I never know ahead of time if I'm going to start using again.
4. I never know I will be using drugs again until it happens.
8. When I start using drugs again, it's not planned.

Short Delay Relapse

2. I crave for less than one hour before I start using again.
7. I crave for less than one day before I start using again.
6. I think about using drugs for less than an hour before I start using again.

Long Delay Relapse

3. I plan for several days before I start using drugs again.
5. I think about using drugs for more than a day before I start using again.
9. I think a lot about using drugs before I start using again.

F = 1

ST = 2

MT = 3

VT = 4

A score above 9 in a dimension (Sudden Relapse, Short Delay Relapse, Long Delay Relapse) would suggest that this dimension is the patient's predominant relapse style.

Appendix K

Document 7

Demographics Questionnaire

US Demographics Template via Survey Monkey

U.S. Demographics Template**Question Title**

1. In what state or U.S. territory do you live?

Question Title

2. In what ZIP code is your home located? (enter 5-digit ZIP code; for example, 00544 or 94305)

Question Title

3. What is your gender?

- Female
- Male
- Other (specify)

Question Title

4. Which category below includes your age?

- 18-20
- 21-29
- 30-39
- 40-49
- 50-59
- 60 or older

Question Title

5. What is the highest level of school you have completed or the highest degree you have received?

- Less than high school degree
- High school degree or equivalent (e.g., GED)
- Some college but no degree
- Associate degree
- Bachelor degree
- Graduate degree

Question Title

6. Which of the following categories best describes your employment status?

- Employed, working 40 or more hours per week
- Employed, working 1-39 hours per week
- Not employed, looking for work
- Not employed, NOT looking for work
- Retired
- Disabled, not able to work

Question Title

7. How much total combined money did all members of your HOUSEHOLD earn last year?

- \$0 to \$9,999
- \$10,000 to \$24,999
- \$25,000 to \$49,999
- \$50,000 to \$74,999
- \$75,000 to \$99,999
- \$100,000 to \$124,999
- \$125,000 to \$149,999
- \$150,000 to \$174,999
- \$175,000 to \$199,999
- \$200,000 and up
- Prefer not to answer

Question Title

8. Are you Mexican, Mexican-American, Chicano, Puerto Rican, Cuban, Cuban-American, or some other Spanish, Hispanic, or Latino group?

- I am not Spanish, Hispanic, or Latino
- Mexican
- Mexican-American
- Chicano
- Puerto Rican
- Cuban
- Cuban-American
- Some other Spanish, Hispanic, or Latino group
- From multiple Spanish, Hispanic, or Latino groups

Question Title

9. Are you White, Black or African-American, American Indian or Alaskan Native, Asian, Native Hawaiian or other Pacific islander, or some other race?

- White
- Black or African-American
- American Indian or Alaskan Native
- Asian
- Native Hawaiian or other Pacific Islander
- From multiple races
- Some other race (please specify)

Question Title

10. Which of the following best describes your current relationship status?

- Married
- Widowed
- Divorced

- Separated
- In a domestic partnership or civil union
- Single, but cohabiting with a significant other
- Single, never married

Question Title

11. How many children age 17 or younger live in your household?

- None
- 1
- 2
- 3
- 4
- More than 4

Appendix L

Document 8

Proposed Budget

Proposed Budget

Direct Costs

* Design and print evaluation tools and handouts (30 @ \$1.00 = \$30). Electronic evaluation tool = \$20.

* Physical mail (30 @ \$1.00 = \$30) or email survey to patients.

* Analysis of study results. (15hrs @ 20/hr = \$300).

* SPSS software for analysis. (\$100 per month x 3 months = \$300).

* Interviewer/ Recovery discharge coordinator. Setup time, interview time, extra time allowed for barriers and miscellaneous. (30 patients x 1.5hrs) = (45 hrs x \$46/hr) = \$2,076

* Cellphone for coordinator. Prepaid for 2 months (60\$).

Subtotal = \$2786

Indirect Costs

* Use of room/office space. Electricity/ heat/ air conditioning/ internet of space used per month (\$1.64 per square foot (approx. average) x 12ft = \$ 19.68).

* Total transportation cost to and from facility = \$350. 10 miles roundtrip. Average 20 miles per gallon. Average \$2.50 per gallon. Estimated 30 days spent at facility. 30 x 10 = 300 miles. 300/20 = 154.3 gallons. 140 x 2.50 = \$385.75.

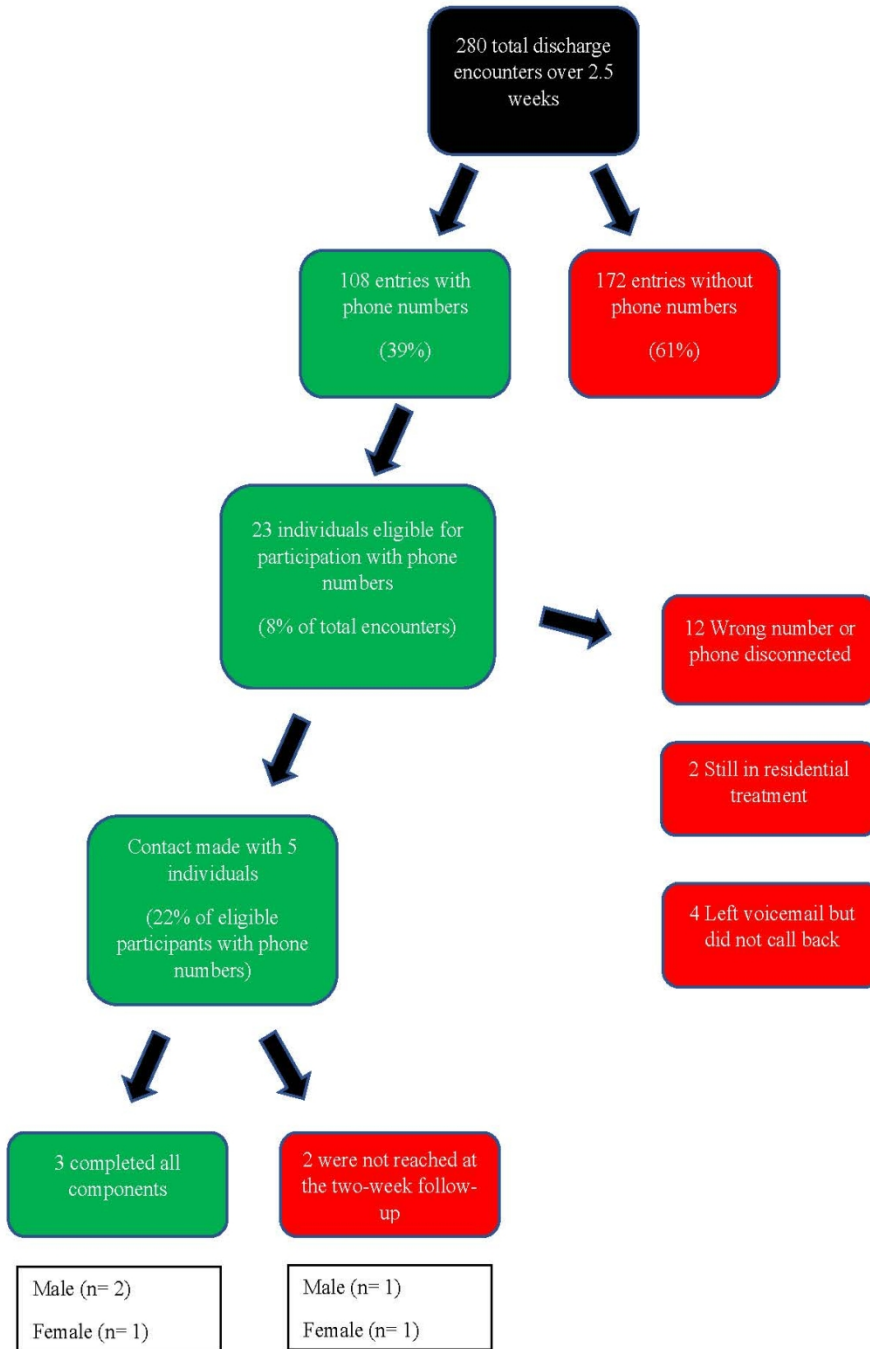
Subtotal = \$405.43

Grand Total = \$ 3191

Appendix M

Figure 3

Flowchart of Participant Enrollment and Retention



Appendix N

Table 3

Frequency Table for Nominal Variables

Variable	<i>n</i>	%
Gender		
Female	2	40
Male	3	60
Missing	0	0
Age_Range		
21-29	1	20
30-39	4	80
Missing	0	0
Relationship_Status		
Divorced	1	20
Married	1	20
Single, cohabiting	1	20
Single, never married	2	40
Missing	0	0
Education		
GED	2	40
High School	1	20
Less than high school degree	1	20
Some college	1	20
Missing	0	0

Note. Due to rounding errors, percentages may not equal 100%.

Appendix O

Table 4

Frequency Table for Nominal Variables

Variable	<i>n</i>	%
In_Crisis		
N	5	100
Missing	0	0
Working		
N	1	20
Y	4	80
Missing	0	0
Outpatient_services		
Y	5	100
Missing	0	0

Note. Due to rounding errors, percentages may not equal 100%.

Appendix P

Table 5

Reliability Table for UCLA 72hr

Scale	No. of Items	α	Lower Bound	Upper Bound
UCLA 72hr	3	0.91	0.81	1.01

Note. The lower and upper bounds of Cronbach's α were calculated using a 95.00% confidence interval.

Appendix Q

Table 6

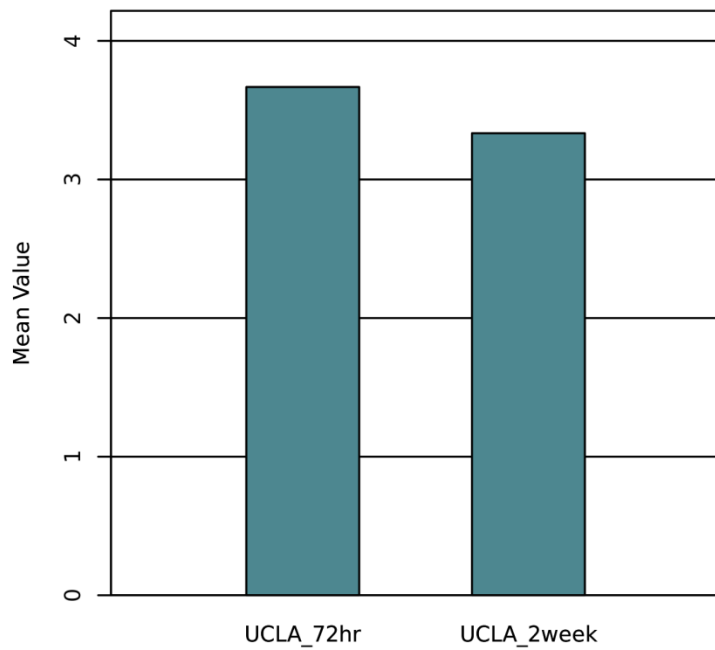
Two-Tailed Paired Samples t-Test for the Difference Between UCLA_72hr and UCLA_2week

UCLA_72hr		UCLA_2week		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
3.67	0.58	3.33	0.58	1.00	.423	0.58

Note. N = 3. Degrees of Freedom for the *t*-statistic = 2. *D* represents Cohen's *d*.

Figure 4

The means of UCLA_72hr and UCLA_2week



Appendix R

Table 7

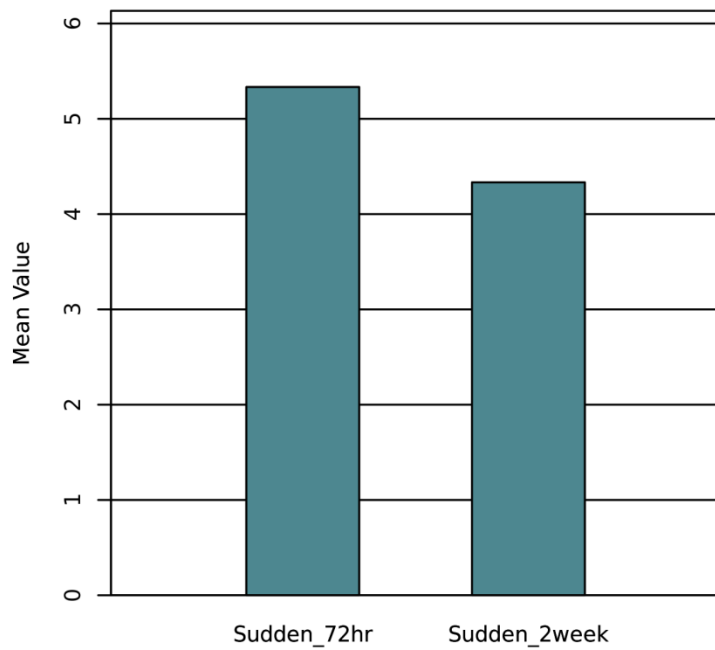
Two-Tailed Paired Samples t-Test for the Difference Between Sudden_72hr and Sudden_2week

Sudden_72hr		Sudden_2week		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
5.33	2.08	4.33	1.15	1.73	.225	1.00

Note. N = 3. Degrees of Freedom for the *t*-statistic = 2. *d* represents Cohen's *d*.

Figure 5

The means of Sudden_72hr and Sudden_2week



Appendix S

Table 8

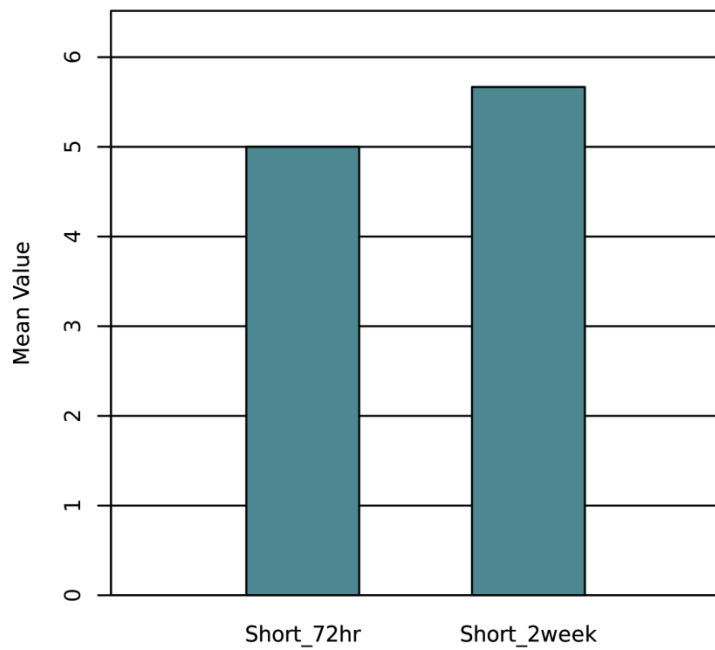
Two-Tailed Paired Samples t-Test for the Difference Between Short_72hr and Short_2week

Short_72hr		Short_2week		<i>t</i>	<i>p</i>	<i>d</i>
<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
5.00	1.00	5.67	0.58	-2.00	.184	1.15

Note. N = 3. Degrees of Freedom for the *t*-statistic = 2. *D* represents Cohen's *d*.

Figure 6

The means of Short_72hr and Short_2week



Appendix T

Table 9

Results for Linear Regression with Short_72hr, Sudden_72hr, and Long_72hr predicting UCLA_72hr

Variable	<i>B</i>	<i>SE</i>	CI	β	<i>t</i>	<i>p</i>
(Intercept)	-0.28	7.17	[-91.38, 90.81]	0.00	-0.04	.975
Short_72hr	0.34	1.59	[-19.92, 20.60]	0.28	0.21	.865
Sudden_72hr	0.36	1.20	[-14.89, 15.62]	0.40	0.30	.814
Long_72hr	0.08	1.48	[-18.75, 18.90]	0.06	0.05	.967

Note. CI is at the 95% confidence level. Results: $F(3,1) = 0.32$, $p = .825$, $R^2 = 0.49$
 Unstandardized Regression Equation: $UCLA_72hr = -0.28 + 0.34*Short_72hr + 0.36*Sudden_72hr + 0.08*Long_72hr$